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A. I. A. FILE No. 30 D11

MASSACHUSETTS

UNIT HEATERS

TYPE "H"



ENGINEERS DATA
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MASSACHUSETTS BLOWER DIVISION
of
THE BISHOP & BABCOCK SALES CO.
General Offices - 4901-4915 Hamilton Ave. N.E.
CLEVELAND, OHIO.

A. I. A. FILE No. 30 D11

MASSACHUSETTS

Massachusetts Type "H" Unit Heaters



Rear View



Front View

18 Inch Type "H" Unit Heater

For installations where floor space is not available, we recommend Massachusetts Type H Unit Heaters, arranged for ceiling suspension. These units are built in three sizes 18", 24" and 30" and can be furnished with deflectors and recirculating boxes if required.

Numerous innovations in design and performance have been incorporated in these units which appeal to the engineering fraternity.

The heater casing is so designed that an air space or plenum is made between the fan and heater section insuring a uniform velocity over the entire heater surface eliminating high velocity points and dead pockets usually found in units where the fans are set directly against the heating medium.

The Propeller Fans used in all Massachusetts Type H Unit Heaters represent a design recognized for its ability to produce larger and more uniform air displacement with less power consumption and quieter operation.

The Fan and motor are mounted in a rigid tripod of close grain grey iron which in turn is securely bolted to the heater casing.

Motors furnished are totally enclosed, automatically lubricated ball bearings, and are sufficiently large to run continuously under any conditions without ventilation, insuring against dust and fumes of factory processes entering and injuring the motor. With single phase alternating current units, condenser type motors are furnished insuring quiet operation and efficiency not to be found in the Repulsion-Induc-



Fan and Motor Assembly

The B&B Line

MASSACHUSETTS

tion and Split Phase types of motors. Three speed switches can be furnished with condenser motors when desired.

Heating Coils:

The heating elements used in all Massachusetts Type H Unit Heaters are high pressure B & B Copper Fin Radiation, and are furnished two and three tubes deep and in one or two sections depending on the size of the heater and the requirements of the particular installation.



B & B Heating Coil

The heater consists of $\frac{3}{4}$ " copper tubes, each tube is wrapped with a thin copper radial fin $1\frac{1}{2}$ " outside diameter. These fins which are tinned to the tubes to insure a perfect bond, are of proper width to give maximum heat transfer with a minimum tube spacing, and the spacing of the fins are such as to give a maximum surface without undue air resistance.

The tubes are mounted between heavy brass tube sheets and fused into holes in these sheets to insure leak-proof joints under all operating conditions.

The headers are of close grain cast iron; the return header having an eccentric tapping to prevent accumulation of condensate in the heater section.

The heater sections are designed to operate on steam pressures up to 125 pounds per square inch, and each section is subjected to a 250 pound per square inch hydrostatic test before being assembled into the casing.



Rear View



Front View

24 Inch Type H Unit Heater

The heater casings, both inside and out, are finished in two coats of high grade olive green lacquer. The fan wheels are given two coats of special paint of contrasting color, which resists the wearing action of the air passing through the fan.

The B&B Line

MASSACHUSETTS

The performance and efficiency of Massachusetts Type H Unit Heaters can be increased when installed in conjunction with Recirculating boxes by means of which it is possible to more nearly approach the highly efficient performance of the Type V or floor mounted units.

With recirculating boxes the cool strata of air is taken from a point just above the floor level, drawn up through the vertical recirculating box and discharged above the breathing zone in a horizontal plane. This insures uniform, efficient heating, and prevents overheating in the upper areas.

The use of recirculating boxes is especially desirable where there is considerable height to the building to be heated as there is a much smaller difference between temperatures at the ceiling and floor when this method is used.

Massachusetts recirculating boxes are constructed of heavy blue annealed steel sheets reinforced with a frame of angle iron. They are equipped with doors fitted with latches and hinges which permits inspection of the motor.

Massachusetts Type H Unit Heaters can be arranged for ventilating as well as heating by means of a fresh air intake box fitted with dampers allowing any portion of the air to be recirculated or drawn from out of doors as desired.



Type H Unit Heater with Louvre Deflectors

Where the use of a recirculating box is precluded due to lack of floor space, and the units must be hung high above the floor, deflectors are often used to direct the air downward. Adjustable louvre deflectors, which may be regulated as to the angle of discharge, can be had for all Type H Unit Heaters.

Large mesh grilles of heavy wire, which cover the entire face of the heater, protecting the tubes of the heating element from damage, can be furnished when desired.



Type H Unit Heater
Floor type with recirculating box

MASSACHUSETTS



Rear View



Front View

30 Inch Type H Unit Heater

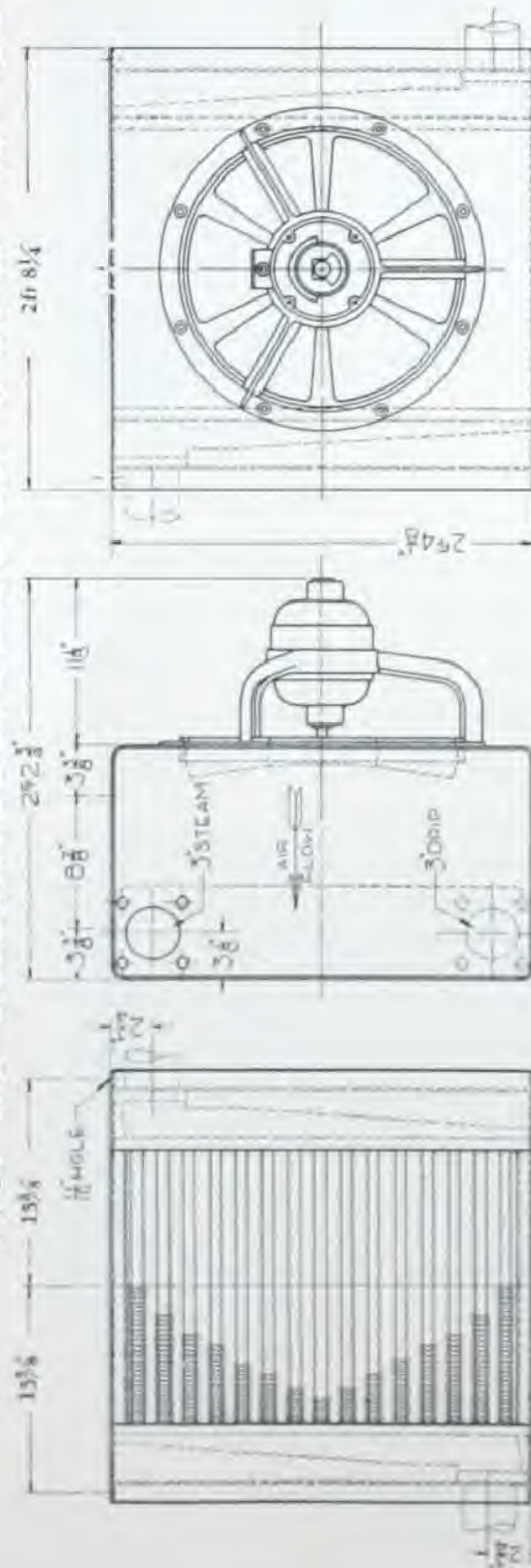
The location of unit heaters plays such an important part in the efficient performance and results obtained that every consideration should be given this feature. Bishop & Babcock Engineers are available for laying out the unit heating system; this service without charge or obligation.



Plan of Typical Small Manufacturing Plant Heated and Ventilated by
Massachusetts Type "H" Unit Heater

The B&B Line

No. 18 MASSACHUSETTS TYPE "H" UNIT HEATERS



SPECIFICATIONS

FAN:—18" Design 5 Massachusetts Electric Propeller Fan.

MOTOR:—Totally enclosed round frame, ball bearing motor. Single phase units furnished with condenser type motors.

HEATER:—No. 22 High Pressure B. & B. Heater Sections— $\frac{3}{4}$ " copper tubes and $1\frac{1}{8}$ " copper fins, all tinned, the former welded into drilled holes in the brass tube sheets. Headers of close grained cast iron.

All heaters are designed for 125 pounds steam working pressure, and are tested at 250 pounds hydrostatic pressure.

Linear feet of tubing:—2-Row—53 feet;
3-Row—81 feet.

INLET SIDE ELEVATION

RETURN END ELEVATION

DISCHARGE SIDE ELEVATION

HEATER	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condensation lbs. per hour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs. per hour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs. per hour	Equiv. Rad. sq. ft.
Number of tubes deep															
2 Rows	3440 2260 1690	●1750 1150 860	$\frac{1}{4}$ $\frac{3}{8}$ $\frac{1}{2}$	105 110.5 115	125620 96520 80510	129.5 99.5 83	525 403 333	111.5 118.5 124	149460 114720 95200	157 120.5 100	625 480 398	130 141 149	215900 165840 137680	241.5 185.5 154	899 690 572
3 Rows	3200 2100 1570	●1750 1150 860	$\frac{1}{4}$ $\frac{3}{8}$ $\frac{1}{2}$	120 128 133	136840 120100 101850	172 130 105	695 526 425	124 139.5 145.5	198020 149940 121380	208 157.5 127.5	826 627 509	157.5 172 182	286530 216350 175220	320.5 242 196	1190 900 730
2 Rows	3440 2260 1690	●1750 1150 860	$\frac{1}{4}$ $\frac{3}{8}$ $\frac{1}{2}$	108 115 120	138240 106360 88320	144 111 92	576 444 368	118 126.5 133	172140 132490 122880	184.5 142 117.5	719 552 457	137.5 149.5 158.5	239570 184020 152770	276 212 176	1000 769 636
3 Rows	3200 2100 1570	●1750 1150 860	$\frac{1}{4}$ $\frac{3}{8}$ $\frac{1}{2}$	125 134 139.5	183840 139200 112320	191.5 145 117	765 580 469	139 150.5 158	228590 172610 139950	245 185 150	955 721 584	168.5 185 195	318120 240440 194870	366.5 277 224.5	1328 1007 811
2 Rows	3440 2260 1690	●1750 1150 860	$\frac{1}{4}$ $\frac{3}{8}$ $\frac{1}{2}$	97 103 108.5	136770 104760 86820	141 108 89.5	571 448 363	104 111.5 117	161360 123760 102340	169.5 130 107.5	673 516 428	123.5 134.5 144	229310 176120 146170	256.5 197 163.5	954 733 606
3 Rows	3200 2100 1570	●1750 1150 860	$\frac{1}{4}$ $\frac{3}{8}$ $\frac{1}{2}$	113 122.5 127.5	180910 137260 111070	186.5 141.5 114.5	755 573 464	123.5 134 140.5	213250 161840 131380	224 170 138	890 676 546	151.5 168 177.5	303070 230650 185950	339 258 208	1261 956 775
2 Rows	3440 2260 1690	●1750 1150 860	$\frac{1}{4}$ $\frac{3}{8}$ $\frac{1}{2}$	101 108 113.5	150240 115200 95520	156.5 120 99.5	625 481 398	110.5 119 126	184730 141820 117090	198 152 125.5	770 592 489	130 143 152.5	253460 194430 161450	292 224 186	1058 812 673
3 Rows	3200 2100 1570	●1750 1150 860	$\frac{1}{4}$ $\frac{3}{8}$ $\frac{1}{2}$	119 128.5 134.5	198720 150720 121920	207 157 127	828 629 510	133 145 152.5	244450 185210 149750	262 198.5 160.5	1017 774 625	162.5 179.5 191	335920 254760 206580	387 293.5 238	1400 1061 860

70 °F

60 °F

No. 18 Massachusetts Type "H" Unit Heaters—Continued

Entering Air Temp.	HEATER	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Conden- sation lbs. per hour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Conden- sation lbs. per hour	Equiv. Rad. sq. ft.						
50 °F	Number of tubes deep																	
	2 Rows	3440	●1750	1/4	0 lbs. Steam Pressure—212 °F								10 lbs. Steam Pressure—240 °F					
		2260	1150	1/6	89	147930	152.5	616	97	171840	180.5	716						
		1690	860	1/10	96.5	113490	117	473	104	131850	138.5	550						
	3 Rows	3200	●1750	1/4	102	94090	97	392	110.5	109480	115	457						
		2100	1150	1/6	107.5	195940	202	819	117	228480	240	952						
		1570	860	1/10	117	148900	153.5	620	128	172790	181.5	721						
	2 Rows	3440	●1750	1/4	122.5	120280	124	501	134.5	139940	147	584				25 lbs. Steam Pressure—267 °F		
		2260	1150	1/6	93.5	161280	168	671	102.5	195930	210	816						
		1690	860	1/10	101	123840	129	515	112.5	150210	161	626						
	3 Rows	3200	●1750	1/4	106	102720	107	427	120	125020	134	521						
		2100	1150	1/6	112.5	214080	223	897	127	260310	279	1086						
1570		860	1/10	123	162240	169	675	139.5	197330	211.5	824							
30 °F	2 Rows	3440	●1750	1/4	129.5	131520	137	548	147	160000	171.5	666				75 lbs. Steam Pressure—320 °F		
		2260	1150	1/6	74	170720	176	712	81	194210	204	810						
		1690	860	1/10	82	131440	135.5	549	90	149460	157	623						
	3 Rows	3200	●1750	1/4	88.5	108640	112	454	97	123760	130	515						
		2100	1150	1/6	94.5	226980	234	948	104	258470	271.5	1079						
		1570	860	1/10	105	171690	177	717	116.5	195160	205	815						
	2 Rows	3440	●1750	1/4	112.5	140170	144.5	585	124.5	159460	167.5	664				125 lbs. Steam Pressure—353 °F		
		2260	1150	1/6	78.5	184320	192	769	88.5	218790	234.5	914						
		1690	860	1/10	86.5	142080	148	591	98	168410	180.5	703						
	3 Rows	3200	●1750	1/4	93	117600	122.5	489	105.5	139480	149.5	581						
		2100	1150	1/6	99.5	244800	255	1020	114	291100	312	1212						
		1570	860	1/10	111	185280	193	773	128	220190	236	921						
0 °F	2 Rows	3440	●1750	1/4	119	151200	157.5	628	138	179600	192.5	750				75 lbs. Steam Pressure—320 °F		
		2260	1150	1/6	50	204670	211	855	56	226580	238	942						
		1690	860	1/10	60	158110	163	658	67	174220	183	726						
	3 Rows	3200	●1750	1/4	66.5	130470	134.5	544	74	143750	151	600						
		2100	1150	1/6	74.5	273060	281.5	1132	82.5	300830	316	1250						
		1570	860	1/10	86.5	205640	212	860	96	226580	238	946						
	2 Rows	3440	●1750	1/4	95	168300	173.5	702	105.5	186120	195.5	776				125 lbs. Steam Pressure—353 °F		
		2260	1150	1/6	54.5	218880	228	911	63	250980	269	1047						
		1690	860	1/10	64.5	168480	175.5	700	74.5	193130	207	807						
	3 Rows	3200	●1750	1/4	71.5	139200	145	579	83	160000	171.5	666						
		2100	1150	1/6	79	289920	302	1208	92	333080	357	1391						
		1570	860	1/10	92.5	219840	229	916	107	251910	270	1050						

C. F. M.—The cubic feet of air per minute rating in the above tables represents the total quantity of air handled by the fans at the entering air temperature.

R. P. M. The speeds shown correspond to full load R. P. M. of commercial direct current and 60 cycle alternating current motors.

●The 1750 R. P. M. units should not be used on installations where practically silent operation is required.

EQUIVALENT RADIATION—The equivalent square foot of direct cast iron column radiator is based on a heat emission of 240 B. T. U. per hour per foot square of direct radiation.

No. 24 MASSACHUSETTS TYPE "H" UNIT HEATERS

SPECIFICATIONS

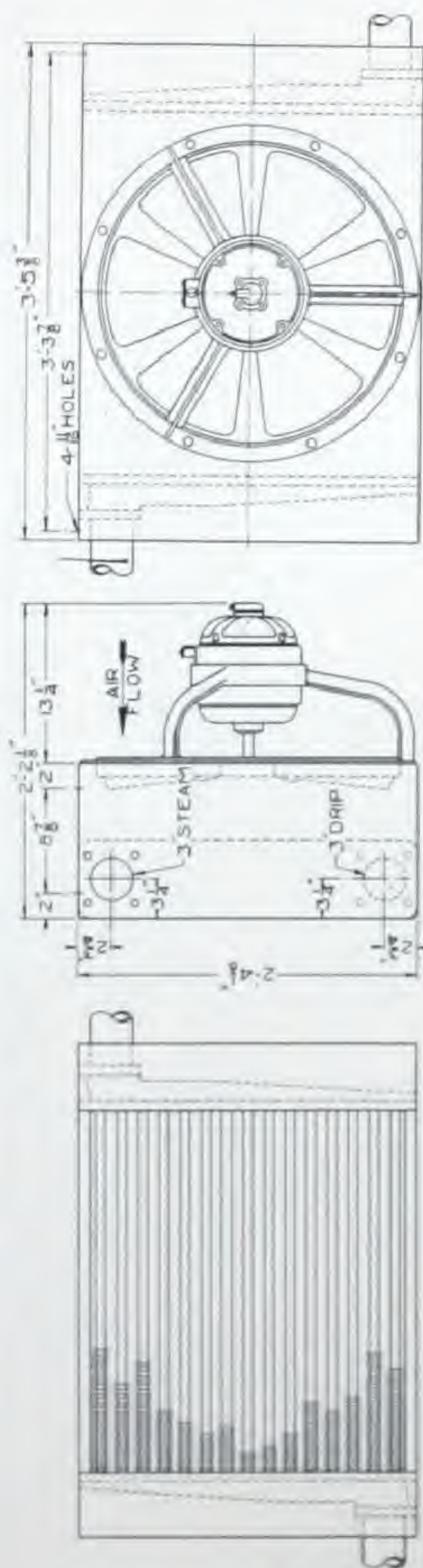
FAN:—24" Design 5 Massachusetts Electric Propeller Fan.

MOTOR:—Totally enclosed, round frame, ball bearing motors. Single phase units furnished with condenser type motors.

HEATER:—No. 31 High Pressure B. & B. Heater Sections— $\frac{3}{4}$ " copper tubes and $1\frac{1}{2}$ " copper fins, all tinned; the former welded into drilled holes in the brass tube sheets. Headers of close grained cast iron.

All heaters are designed for 125 pounds steam working pressure, and are tested at 250 pounds hydrostatic pressure.

Linear feet of tubing:—2-row—75 feet;
3-row—114 feet.



DISCHARGE SIDE ELEVATION

RETURN END ELEVATION

INLET SIDE ELEVATION

HEATER	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condensation lbs. per hour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs. per hour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs. per hour	Equiv. Rad. sq. ft.
Number of tubes deep															
2 Rows	4950 3650	●1150 860	$\frac{1}{2}$ $\frac{1}{3}$	102.5 106.5	170470 141770	176 146	710 590	109 114	203210 169000	213.5 177.5	846 705	127 134.5	292500 243330	327 272	1220 1012
3 Rows	4200 3100	●1150 860	$\frac{1}{2}$ $\frac{1}{3}$	119.5 125	217440 178300	224 184	906 744	129.5 136	259200 212540	272 223	1080 886	157.5 168	373200 306020	417 342	1555 1275
2 Rows	4950 3650	●1150 860	$\frac{1}{2}$ $\frac{1}{3}$	106 110.5	188160 156480	196 163	785 652	115 121	234250 194820	251 209	975 813	133.5 142	325520 270710	375 312	1357 1127
3 Rows	4200 3100	●1150 860	$\frac{1}{2}$ $\frac{1}{3}$	125 131	240000 196800	250 205	1000 820	139 147	298800 245020	320.5 262.5	1248 1020	168 180	415200 340160	478.5 392	1730 1418
2 Rows	4950 3650	●1150 860	$\frac{1}{2}$ $\frac{1}{3}$	95 99.5	185610 153650	191.5 158.5	773 640	101 106.5	218780 181120	229.5 190	913 755	119.5 127.5	310370 256930	347 287	1292 1070
3 Rows	4200 3100	●1150 860	$\frac{1}{2}$ $\frac{1}{3}$	113.5 119.5	236390 194370	243.5 200.5	986 810	123 130.5	278640 229100	292.5 240.5	1160 955	152 163	395280 325010	442 363.5	1645 1354
2 Rows	4950 3650	●1150 860	$\frac{1}{2}$ $\frac{1}{3}$	98.5 103.5	203520 168480	212 175.5	848 702	107.5 113.5	250330 207230	268.5 222	1041 863	126.5 135	343950 284730	396 328	1432 1185
3 Rows	4200 3100	●1150 860	$\frac{1}{2}$ $\frac{1}{3}$	118.5 127	259200 213120	270 222	1080 887	132.5 141.5	318820 262140	341.5 281	1330 1090	162.5 182	438050 381480	504.5 439.5	1825 1588

70° F.

60° F.

No. 24 Massachusetts Type "H" Unit Heaters—Continued

Enter- ing Air Temp.	HEATER Number of tubes deep	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Conden- sation lbs. per hour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Conden- sation lbs. per hour	Equiv. Rad. sq. ft.
50 °F.					0 lbs. Steam Pressure—212 °F.				10 lbs. Steam Pressure—240 °F.			
	2 Rows	4950 3650	●1150 860	1½ 1½	87 92	201150 166380	207.5 171.5	839 693	93.5 99	234280 193780	246 203.5	975 808
	3 Rows	4200 3100	●1150 860	1½ 1½	107 114	257050 210840	265 217.5	1070 879	117 124.5	299380 245550	314.5 258	1245 1022
					5 lbs. Steam Pressure—227 °F.				25 lbs. Steam Pressure—267 °F.			
	2 Rows	4950 3650	●1150 860	1½ 1½	91 96	219360 181440	228.5 189	914 756	100 106	267180 220990	286.5 237	1113 921
	3 Rows	4200 3100	●1150 860	1½ 1½	112.5 120	280320 229920	292 239.5	1169 958	127 136.5	341430 280040	366 300	1421 1166
30 °F.					0 lbs. Steam Pressure—212 °F.				10 lbs. Steam Pressure—240 °F.			
	2 Rows	4950 3650	●1150 860	1½ 1½	72 77	232520 191540	239.5 197.5	969 796	78 84	264340 217750	277.5 228.5	1100 906
	3 Rows	4200 3100	●1150 860	1½ 1½	94.5 102	296220 244100	305.5 251.5	1235 1016	103.5 113	336760 277510	353.5 291.5	1402 1156
					5 lbs. Steam Pressure—227 °F.				25 lbs. Steam Pressure—267 °F.			
	2 Rows	4950 3650	●1150 860	1½ 1½	75.5 81	250560 206400	261 215	1042 860	85 91	298170 245620	319.5 263	1242 1022
	3 Rows	4200 3100	●1150 860	1½ 1½	100 107	319200 263040	332.5 274	1330 1095	113 124	379850 313020	407 335.5	1582 1304
0 °F.					0 lbs. Steam Pressure—212 °F.				10 lbs. Steam Pressure—240 °F.			
	2 Rows	4950 3650	●1150 830	1½ 1½	48.5 54.5	281230 231340	290 238.5	1170 962	54 60	308020 253370	323.5 266	1283 1054
	3 Rows	4200 3100	●1150 860	1½ 1½	74.5 84	358340 294840	369.5 304	1493 1228	82 93	392470 322920	412 339	1635 1346
					5 lbs. Steam Pressure—227 °F.				25 lbs. Steam Pressure—267 °F.			
	2 Rows	4950 3650	●1150 860	1½ 1½	51.5 58	297600 244800	310 255	1240 1020	60 67	342240 281520	367 302	1423 1171
	3 Rows	4200 3100	●1150 860	1½ 1½	79.5 89	379200 312000	395 325	1580 1300	92 104	436080 358800	467.5 384.5	1817 1495

C. F. M.—The cubic feet of air per minute rating in the above tables represents the total quantity of air handled by the fans at the entering air temperature.

R. P. M.—The speeds shown correspond to full load R. P. M. of commercial direct current and 60 cycle alternating current motors.

●The 1150 R. P. M. units should not be used on installations where practically silent operation is required.

EQUIVALENT RADIATION—The equivalent square feet of direct cast iron column radiator is based on a heat emission of 240 B. T. U. per hour per square foot of direct radiation.

No. 30 MASSACHUSETTS TYPE "H" UNIT HEATERS

SPECIFICATIONS

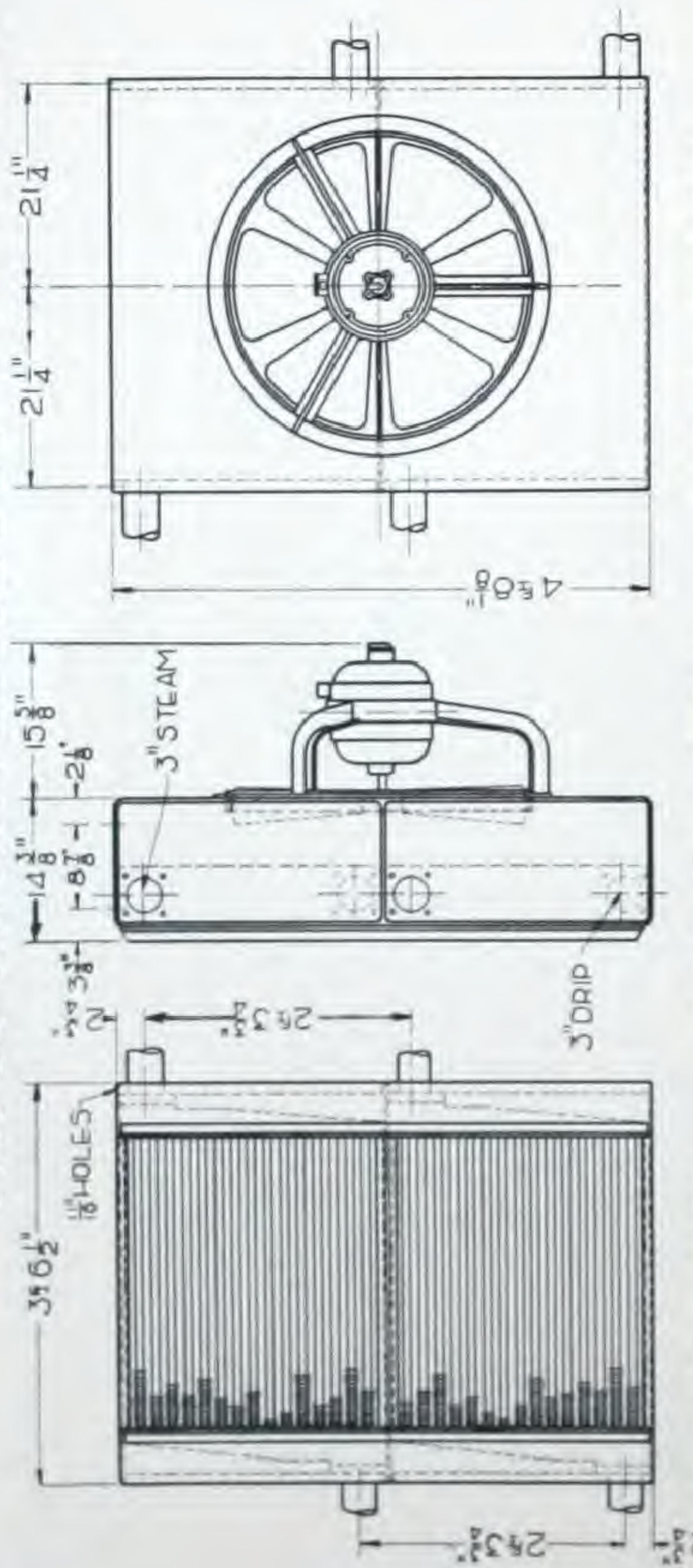
FAN:—30" design 5 Massachusetts Electric Propeller Fan.

MOTOR:—Totally enclosed, round frame, ball bearing motors. Single Phase units furnished with condenser type motors.

HEATER:—2 sections of No. 37 High Pressure B. & B. Heater Sections— $\frac{3}{4}$ " copper tubes and $1\frac{1}{2}$ " copper fins, all tinned, the former welded into drilled holes in the brass tube sheets. Headers of close grained cast iron.

All heaters are designed for 125 pounds steam working pressure, and are tested at 250 pounds hydrostatic pressure.

Linear feet of tubing:—2 row—180 feet,
3 row—272 feet.



INLET SIDE ELEVATION

RETURN END ELEVATION

DISCHARGE SIDE ELEVATION

HEATER	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condensation lbs. per hour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs. per hour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs. per hour	Equiv. Rad. sq. ft.
Number of tubes															
2 Rows	6650 5400	690 560	$\frac{1}{2}$ $\frac{3}{4}$	107 110	259960 226980	268 234	1082 946	115 118.5	312730 273220	328.5 287	1300 1138	135 140	446110 388890	499 435	1860 1622
3 Rows	6100 4950	690 560	$\frac{1}{2}$ $\frac{3}{4}$	123 128	335530 297790	349 307	1410 1238	134.5 140.5	407460 358900	428 377	1700 1495	164.5 173	581100 511370	650 572	2420 2130
2 Rows	6650 5400	690 560	$\frac{1}{2}$ $\frac{3}{4}$	111 114.5	286560 250560	298.5 261	1193 1043	121.5 125.5	356870 312090	382.5 334.5	1488 1300	143 148.5	495630 434000	571 500	2065 1810
3 Rows	6100 4950	690 560	$\frac{1}{2}$ $\frac{3}{4}$	129 133	373440 328800	389 342.5	1555 1370	144.5 150	465570 410050	499 439.5	1945 1708	176 186.5	646660 568540	745 655	2695 2365
2 Rows	6650 5400	690 560	$\frac{1}{2}$ $\frac{3}{4}$	100 102.5	283730 247350	292.5 255	1182 1030	107.5 110.5	334150 291310	351 306	1392 1213	128 133	474270 413920	530.5 463	1975 1720
3 Rows	6100 4950	690 560	$\frac{1}{2}$ $\frac{3}{4}$	117.5 122	369090 323980	380.5 334	1538 1350	128 134	434110 380800	456 400	1809 1585	158.5 167.5	616860 541760	690 606	2565 2255
2 Rows	6650 5400	690 560	$\frac{1}{2}$ $\frac{3}{4}$	104 107.5	311040 271200	324 282.5	1295 1130	114.5 121	382530 345210	410 370	1596 1438	135 142	526000 458300	606 528	2195 1910
3 Rows	6100 4950	690 560	$\frac{1}{2}$ $\frac{3}{4}$	123 128.5	404640 352200	421.5 370	1685 1480	138.5 145.5	497290 437580	533 469	2070 1822	171 181	684850 600656	789 692	2850 2503

70° F.

60° F.

No. 30 Massachusetts Type "H" Unit Heaters—Continued

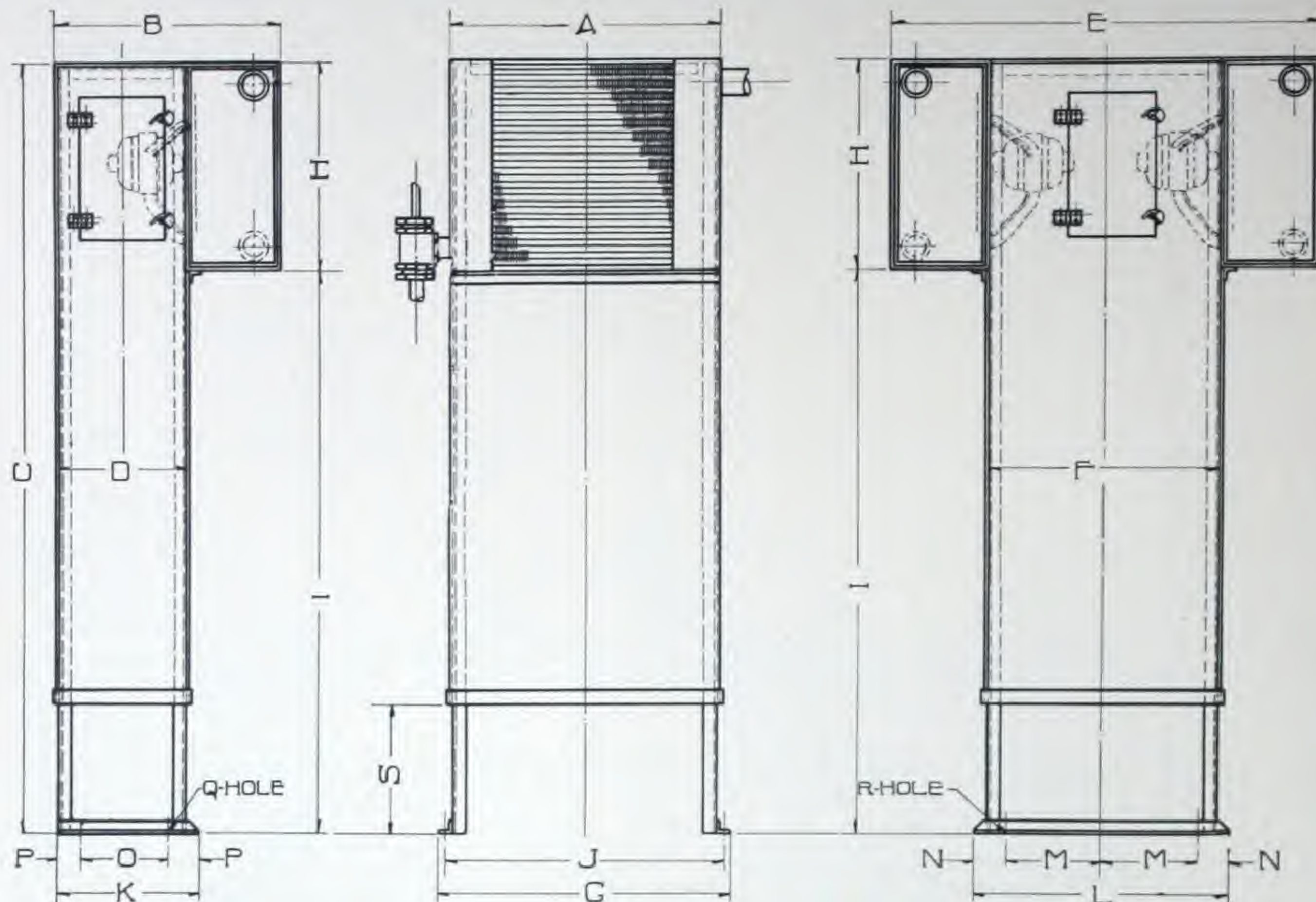
Enter- ing Air Temp.	HEATER Number of tubes deep	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Conden- sation lbs. per hour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Conden- sation lbs. per hour	Equiv. Rad. sq. ft.
50 °F.					0 lbs. Steam Pressure—212 °F.				10 lbs. Steam Pressure—240 °F.			
	2 Rows	6650 5400	690 560	1½ ¾	92.5 96	306520 267720	316 276	1275 1115	99.5 104	356050 311300	374 327	1485 1295
	3 Rows	6100 4950	690 560	1½ ¾	111.5 117	402550 352600	415 363.5	1678 1470	122.5 128.5	466960 409360	490.5 430	1948 1705
					5 lbs. Steam Pressure—227 °F.				25 lbs. Steam Pressure—267 °F.			
	2 Rows	6650 5400	690 560	1½ ¾	96.5 100	333600 291840	347.5 304	1389 1215	107 111	405860 354540	435 380	1690 1475
	3 Rows	6100 4950	690 560	1½ ¾	117.5 123	438240 384000	456.5 400	1825 1600	133 140.5	532740 466500	571 500	2220 1945
30 °F.					0 lbs. Steam Pressure—212 °F.				10 lbs. Steam Pressure—240 °F.			
	2 Rows	6650 5400	690 560	1½ ¾	77.5 81.5	352600 309430	363.5 319	1468 1289	84.5 89	400790 352240	421 370	1670 1465
	3 Rows	6100 4950	690 560	1½ ¾	100 105	465600 403520	480 416	1940 1680	109.5 116	528360 460290	555 483.5	2200 1920
					5 lbs. Steam Pressure—227 °F.				25 lbs. Steam Pressure—267 °F.			
	2 Rows	6650 5400	690 560	1½ ¾	81.5 86	380160 333600	396 347.5	1585 1389	92 97.5	452510 397460	485 426	1885 1655
	3 Rows	6100 4950	690 560	1½ ¾	105 111	501120 436320	522 454.5	2090 1816	121 127.5	597120 518750	640 556	2490 2160
0 °F.					0 lbs. Steam Pressure—212 °F.				10 lbs. Steam Pressure—240 °F.			
	2 Rows	6650 5400	690 560	1½ ¾	56.5 61	436020 382180	449.5 394	1815 1592	61 65.5	467430 409840	491 430.5	1947 1705
	3 Rows	6100 4950	690 560	1½ ¾	83 87.5	579090 499550	597 515	2410 2080	89 95	621660 535980	653 563	2590 2235
					5 lbs. Steam Pressure—227 °F.				25 lbs. Steam Pressure—267 °F.			
	2 Rows	6650 5400	690 560	1½ ¾	58.5 64	451200 395520	470 412	1880 1645	68 73.5	517820 454370	555 487	2158 1890
	3 Rows	6100 4950	690 560	1½ ¾	87 92.5	600000 517920	625 539.5	2500 2155	100 107	689490 593390	739 636	2870 2470

C. F. M.—The cubic feet of air per minute rating in the above tables represents the total quantity of air handled by the fans at the entering air temperature.

R. P. M.—The speeds shown correspond to full load R. P. M. of commercial direct current and 60 cycle alternating current motors.

EQUIVALENT RADIATION—The equivalent square feet of direct cast iron column radiator is based on a heat emission of 240 B. T. U. per hour per square foot of direct radiation.

MASSACHUSETTS



SINGLE DISCHARGE

FRONT ELEVATION

DOUBLE DISCHARGE

Single and Double Recirculating Boxes For Ceiling Type "H" Unit Heaters

Size	A	B	C	D	E	F	G	H	I	Shipping Weight	
										Single	Double
18	32 $\frac{1}{4}$	31	106	18	57 $\frac{3}{4}$	32	34 $\frac{1}{8}$	28 $\frac{1}{8}$	77 $\frac{7}{8}$	365	415
24	41 $\frac{1}{4}$	31	106	18	57 $\frac{3}{4}$	32	44 $\frac{1}{8}$	28 $\frac{1}{8}$	77 $\frac{7}{8}$	425	495
30	56 $\frac{1}{4}$	38 $\frac{3}{8}$	106	24	68 $\frac{3}{4}$	40	59 $\frac{3}{4}$	56 $\frac{1}{8}$	49 $\frac{7}{8}$	525	625

Size	J	K	L	M	N	O	P	Q	R	S	Shipping Weight	
											Single	Double
18	32 $\frac{1}{8}$	18	32	13	3	13	2 $\frac{1}{2}$	$\frac{2}{16}$	$\frac{2}{16}$	18	365	415
24	41 $\frac{1}{8}$	18	32	13	3	13	2 $\frac{1}{2}$	$\frac{2}{16}$	$\frac{2}{16}$	18	425	495
30	57 $\frac{1}{4}$	24	40	17	3	17	3 $\frac{1}{2}$	$\frac{2}{16}$	$\frac{2}{16}$	18	525	625

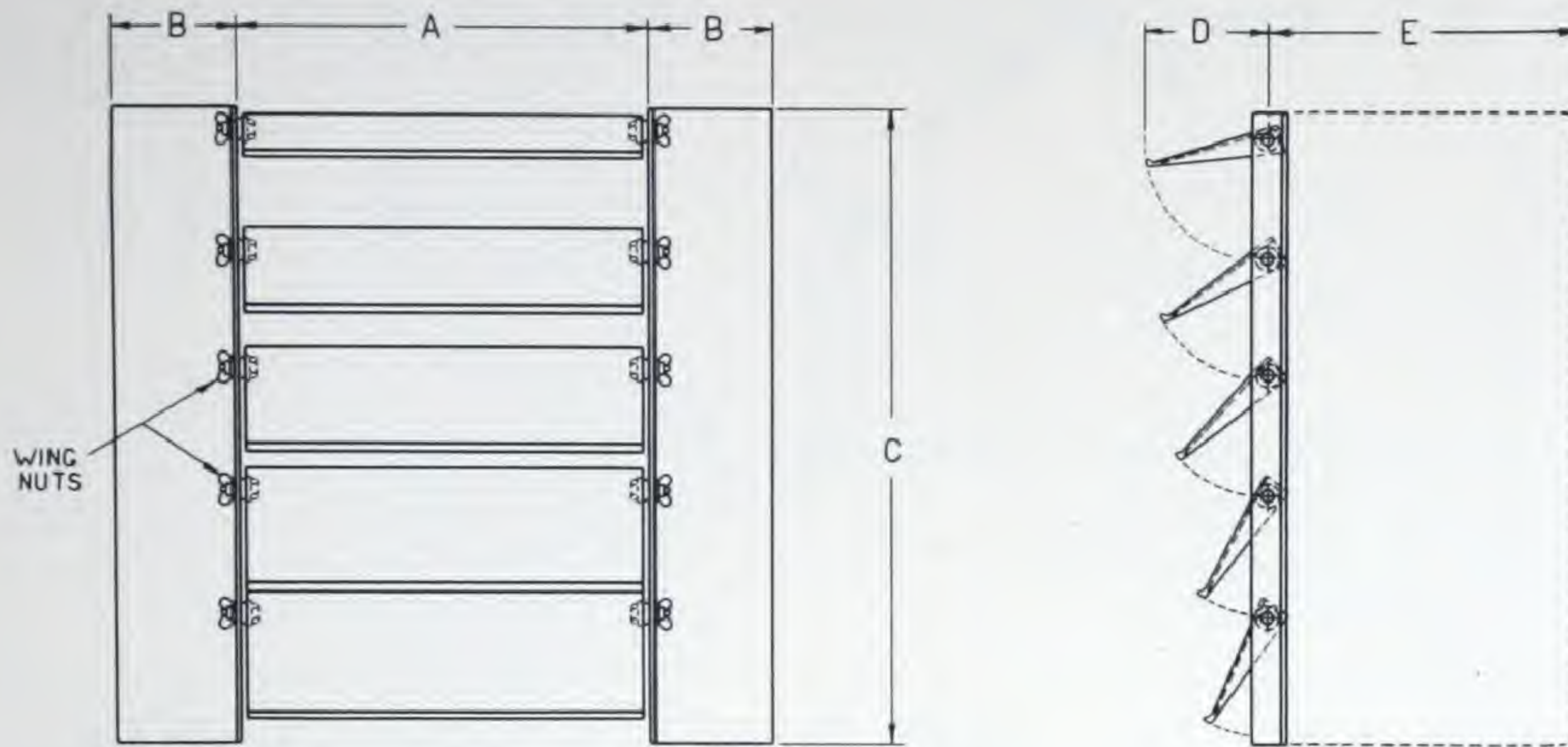
SPECIFICATIONS

Sides, ends, and top, are of 16 gage blue annealed sheets, spot welded to supporting angle legs extending entire length of unit.

Finished to match unit heater with two coats of high grade lacquer.

Damper for mixing fresh and recirculated air can be furnished with all recirculating boxes when required.

The B&B Line



DEFLECTORS FOR TYPE "H" UNIT HEATERS

DEFLECTORS FOR TYPE "H" UNIT HEATERS

Size of Heater	Number of Vanes	Principal Dimensions—Inches				
		A	B	C	D	E
18	5	22	6	28½	6¼	19⅛"
24	5	31	6	28½	6¼	19⅛"
30	10	37	6	56⅜	6¼	19⅛"

SPECIFICATIONS

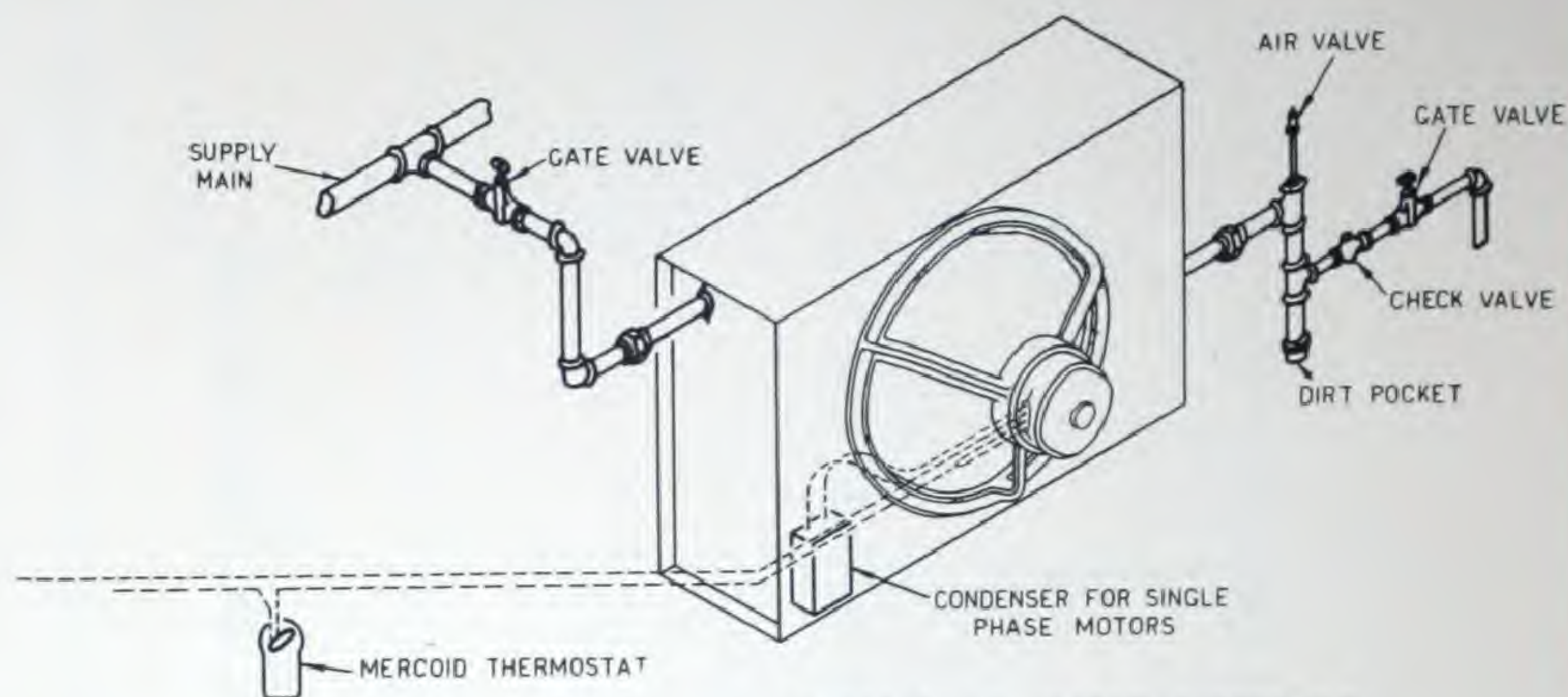
Side plates are integral with heater, of 16 gage steel.

Deflector vanes are adjustable and removable of 20 gage steel.

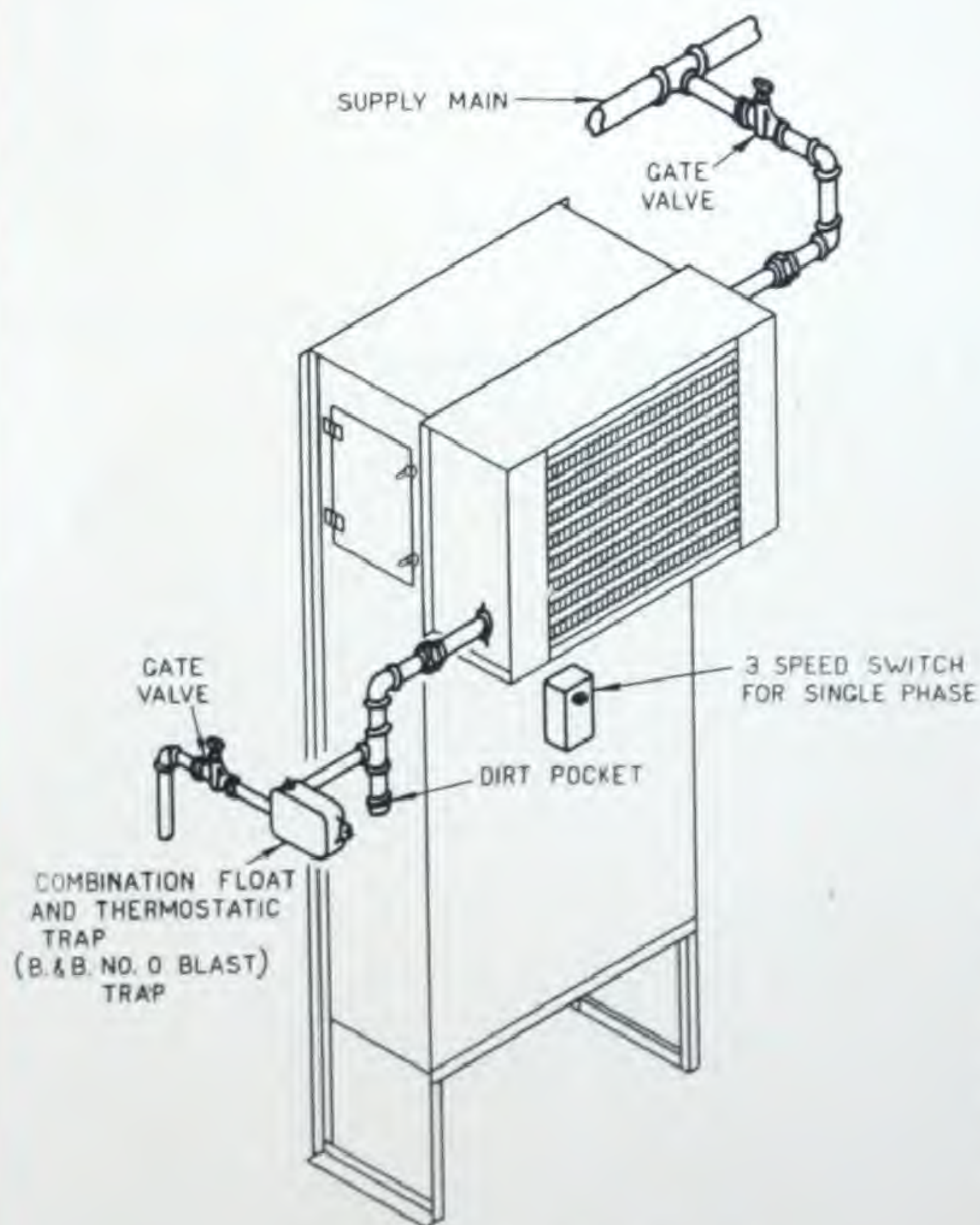
Finish matches that of unit heater.

MASSACHUSETTS

TYPICAL PIPING AND ELECTRICAL CONNECTIONS FOR MASSACHUSETTS TYPE "H" UNIT HEATERS



TYPE "H" UNIT HEATER SUSPENDED FROM CEILING



TYPE "H" UNIT HEATER WITH RECIRCULATING BOX



Because of the decrease in efficiency in thermostatic traps operated over a wide range of discharge temperatures encountered in connection with the varying steam pressures used for unit heaters, the No. 0 Blast Trap has been designed as a combination thermostatic and float trap to meet widely varying conditions without loss of efficiency.

The No. 0 Blast Trap maintains a continuous flow of condensate from the unit, regardless of temperature of condensate, and quickly evacuates the water of condensation under all conditions, eliminating entirely the possibility of freezing.

The No. 0 Blast Trap is designed primarily for unit heaters, being fitted with a Thermostatic member for the relief of air and a large area port opening controlled by a ball float for the evacuation of condensation.

MASSACHUSETTS



Left: Typical installation of Massachusetts Type H Unit Heaters fitted with recirculating boxes for garage heating



Left: Massachusetts Type H Unit Heaters ceiling suspended type for warehouse heating.



Left: Typical installation of Massachusetts Type H Unit Heater, ceiling suspended type for garage heating.



Typical industrial installation of Massachusetts Type H Unit Heater



Above: Typical installation of Massachusetts Type H Unit Heaters fitted with recirculating boxes for garage heating.

A Few Representative Installations of Massachusetts Unit Heaters

Manufacturing Plants

The Brost Pattern Works Cleveland, O.
The Beaver Mfg. Co. Ballardville, Mass.
Cox Refrigerating Engineering Co. Indianapolis, Ind.
Long Bell Lumber Co. Oklahoma City, Okla.
Oklahoma Manufacturing Co. Oklahoma City, Okla.
Franklin County Lumber Co. Greenfield, Mass.
Bridgeport Chair Co. Bridgeport, Conn.
Bullard Machine Tool Co. Bridgeport, Conn.
Meyer Body Co. Buffalo, N. Y.
Ladish Drop Forge Co. Cudahy, Wis.
The Shelby Cycle Co. Shelby, Ohio
W. E. Asplin Basket Co. Chardon, Ohio
Thomas L. Gatke Co. Winona Lake, Ind.
The Toy Kraft Co. Wooster, Ohio
N. Klausner & Sons Co. Cleveland, Ohio
Cummins Canning Co. Conneaut, Ohio
Massachusetts Electric Mfg. Co. West Lynn, Mass.
F. C. Hersee Mfg. Co. Watertown, Mass.
George Weston Biscuit Co. Watertown, Mass.
Hardie Manufacturing Co. Hudson, Mich.
General Industries Co. Elyria, Ohio
The Crew Levick Co. Philadelphia, Pa.
The Brown Company "Berlin Mills" Berlin, New Hampshire
The Liquid Carbonic Co. Cleveland, Ohio
The Liquid Carbonic Co. St. Louis, Mo.
The Pittsburgh Plate Glass Co. Crystal City, Mo.
Forest Furniture Co. N. Wilkesboro, N. C.
Chesapeake & Ohio Railway Co. Shops Russell, Kentucky
The Bender Body Co. Cleveland, Ohio
Pemberton Power Co. Boston, Mass.
Dodge Steel Co. Philadelphia, Pa.
Alemite Lubricating Co. Baltimore, Md.
Bellanca Air Craft Corp. Newcastle, Del.
Central Alloy Steel Co. Canton, Ohio
Cleveland Electric Illuminating Co. Ashtabula, Ohio

Garages, Service Stations and Auto Sales Rooms:

The Mittleman Garage Chicago, Ill.
The Cleveland Clinic Garage Cleveland, O.
The Stanton Garage "Ford" Euclid, Ohio
West Towns R. R. Bus Garage Chicago
The White Motor Co. Detroit, Mich.
Main Street Garage Co. Waltham, Mass.
Morrissey Motor Car Co. Bridgeport, Conn.
The Davison Cartage Co. Chicago, Ill.
Woodland Cemetery Garage Detroit, Mich.
Chevrolet Garage Rochester, Mich.
The White Motor Co. Columbus, Ohio
G. A. Mighton Realty Co. Shaker Hts. O.
Consolidated Cartage Co. Cleveland, Ohio
Richard Lydy Garage Chicago, Ill.

Public Buildings:

The Oklahoma State Penitentiary McAlester, Okla.
The Albert Pike Hotel Little Rock, Ark.
American College of Surgeons Chicago, Ill.
Library Bldg. Oklahoma State University Norman, Okla.
Great Neck High School Great Neck, L. I., N. Y.
Girls' Dormitory Wilburton, Okla.
Administration Bldg. Wilburton, Okla.
McDonogh School Baltimore, Md.
Bethany English Lutheran Church Cleveland, Ohio

Miscellaneous Applications:

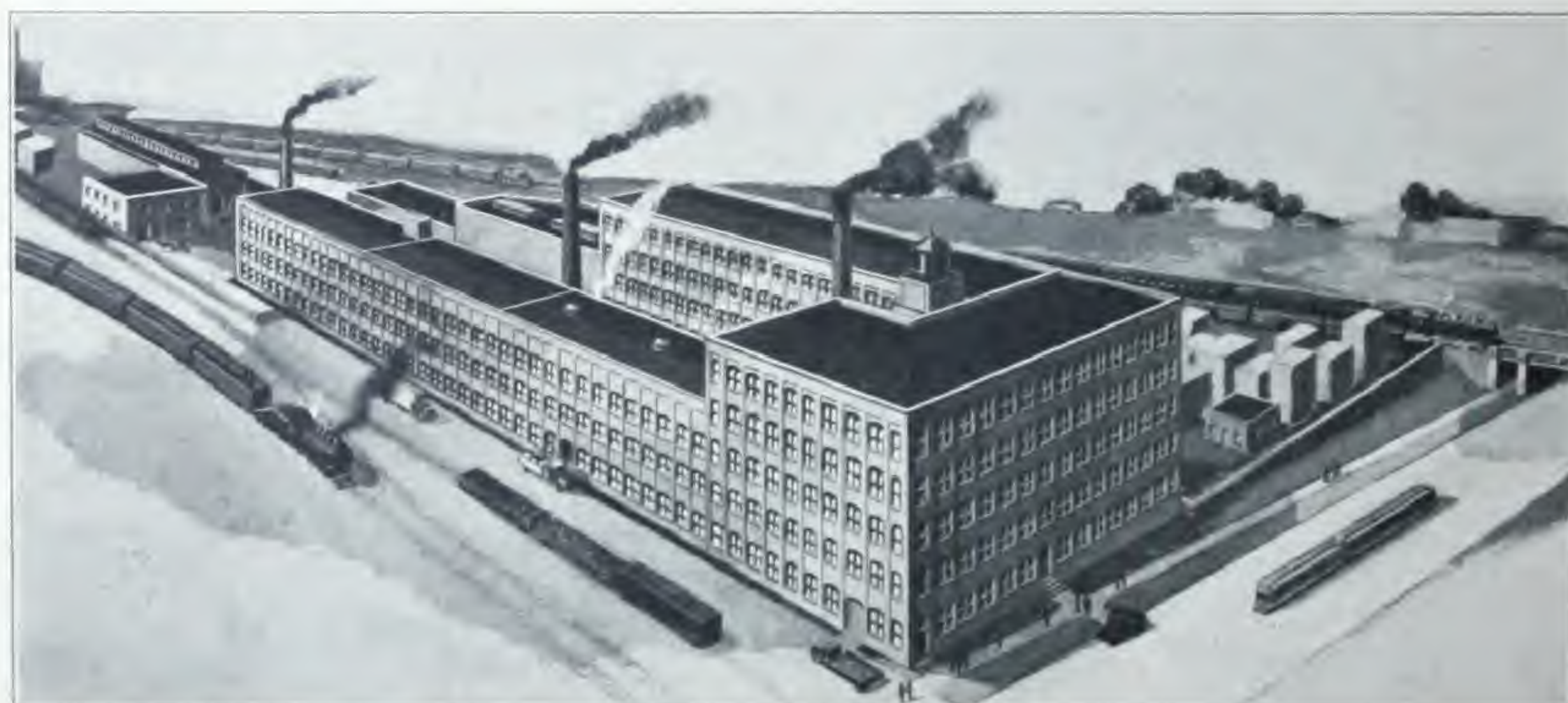
Maggenti & Dougherty Co. Philadelphia
Samuel Stelke Stamford, Conn.
L. J. Fitzpatrick Southampton, Pa.
Lord, Hawley & Hammell Philadelphia
Chas. A. Thomas Berlin, N. J.
Sol. H. Goldberg Chicago, Ill.
A. H. Riviere Co. Summit, N. J.
Rickley Brothers Philadelphia, Pa.
Kalloh & Scull Co. Philadelphia, Pa.
Joseph Kettman Co. Bridgeport, Conn.
Stephenson Contracting Co. Atlanta, Ga.
Max Klunman Baltimore, Md.
R. T. Pender, Inc. Lynn, Mass.
J. B. Kennedy Co. Greenfield, Mass.
Krane Engineering Co. Chicago, Ill.
Brooklyn Plumbing Co. Waterbury, Conn.
Morris Winnikoff Co. Waterbury, Conn.
E. J. Claffy Chicago, Ill.
Ben Kahn & Co. Cleveland, Ohio

The B&B Line

MASSACHUSETTS



No. 1 PLANT
4901-4915 HAMILTON AVE., N. E.



No. 2 PLANT
1194-1204 EAST 55th STREET, N. E.

Factories of
The Bishop & Babcock Mfg. Co.
Cleveland, Ohio

MANUFACTURERS OF

Thermostatic Traps
Radiator Supply Valves
Low Pressure Steam Specialties
Temperature Regulation Apparatus
Seamless Multiflex Metal Bellows

Humidity Regulation Apparatus
Miscellaneous Ventilating Equipment
Massachusetts Fans, Air Washers and
Unit Heaters
Automobile Thermostats

ESTABLISHED 1879
Branches in Principal Cities

The B&B Line